UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 7,333,485 B2
APPLICATION NO. : 10/667649
DATED : February 19, 2008
INVENTOR(S) : Michael L. Witkowski et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

The title page, showing an illustrative figure, should be deleted and substitute therefor the attached title page.

On sheet 1 of 13, in Fig. 1, delete

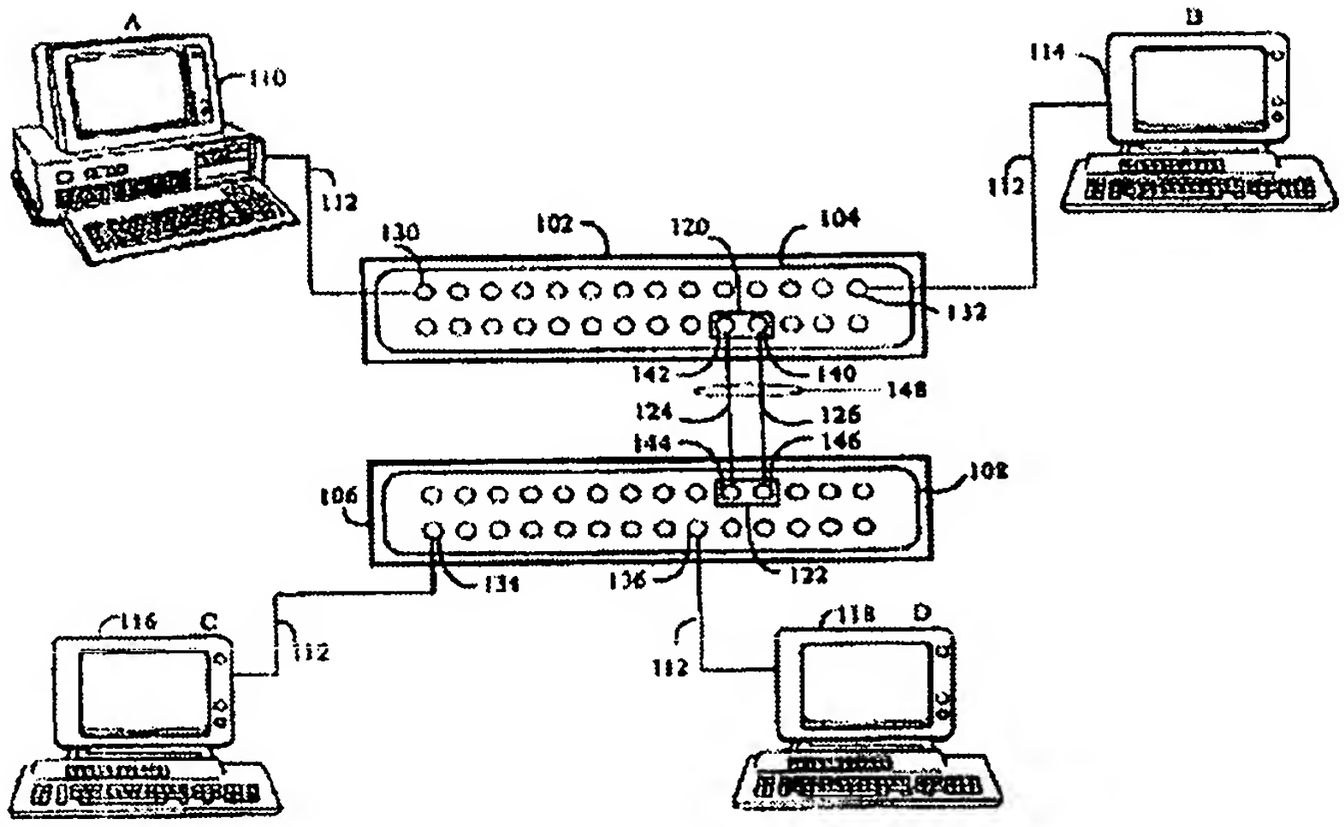

FIG. 1

“ ” and insert

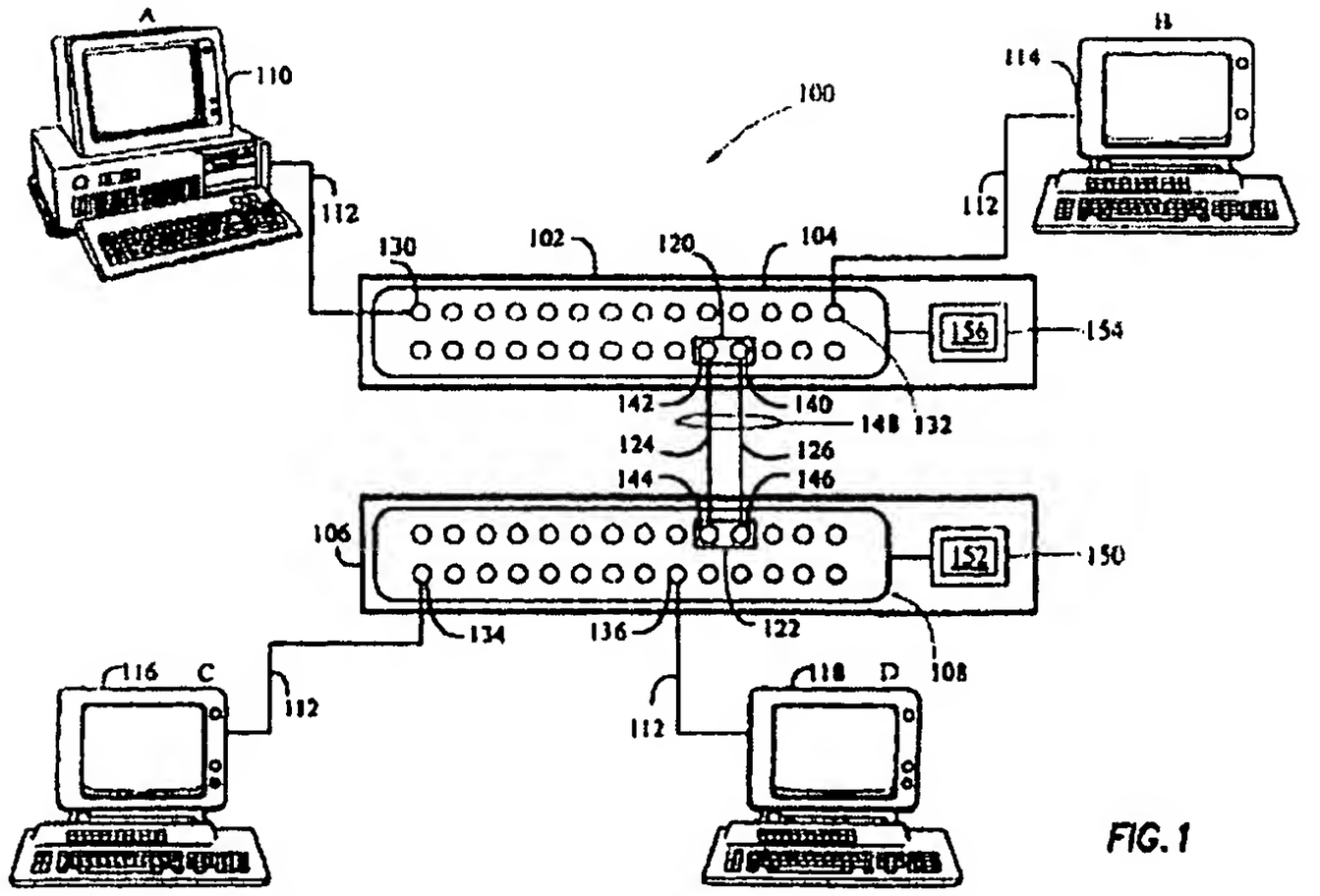

FIG. 1

--, therefor.

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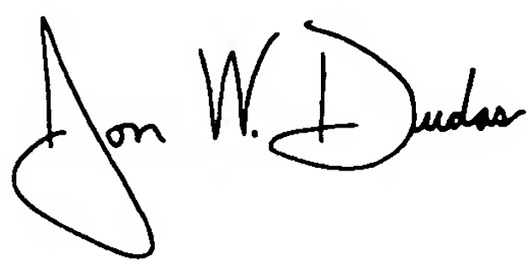
In column 24, line 49, in Claim 1, delete "line" and insert -- link --, therefor.

In column 24, line 62, in Claim 2, after "port" insert -- link --.

Signed and Sealed this

First Day of July, 2008



JON W. DUDAS
Director of the United States Patent and Trademark Office

(12) **United States Patent**
Witkowski et al.

(10) **Patent No.: US 7,333,485 B2**
(45) **Date of Patent: Feb. 19, 2008**

(54) **NETWORK COMMUNICATION DEVICE INCLUDING BONDED PORTS FOR INCREASED BANDWIDTH**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 806 days.

(21) Appl. No.: **10/667,649**

(22) Filed: **Sep. 22, 2003**

(65) **Prior Publication Data**

US 2004/0068589 A1 Apr. 8, 2004

Related U.S. Application Data

(60) Division of application No. 08/936,072, filed on Sep. 23, 1997, now Pat. No. 6,665,733, which is a continuation-in-part of application No. 08/774,605, filed on Dec. 30, 1996, now Pat. No. 6,260,073.

(51) **Int. Cl.**
H04L 12/28 (2006.01)

(52) **U.S. Cl.** 370/389

(58) **Field of Classification Search** 370/389; 709/249

See application file for complete search history.

(56) **References Cited**

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Evaluating Port-Switching Hubs (A reality check for virtual workgroups), Data Comm Lab Test/Port, 8178 Data Communications, No. 9, New York, U.S., Jun. 22, 1993, pp. 52-56, 58, 60, and 62.

Primary Examiner—Wing Chan
Assistant Examiner—Lawrence J Burrowes

(57) **ABSTRACT**

A network communication device including port control circuitry for controlling packet flow between the ports of the device, where the port control circuitry includes a port manager that directs packets between the ports and port bonding circuitry that bonds two or more of the ports into a bonded port set. For each packet to be sent via the bonded port set, the port bonding circuitry selects one of the bonded ports for transmitting the packet. More than one bonded port set may be defined in a given communication device, and each bonded port set may include from two ports up to all the ports of the device, as long as each port is included in only one bonded port set. One or more port bonding registers are provided to identify which of the plurality of ports are bonded in each bonded port set. In one embodiment, the bonded ports are selected on a packet by packet basis so as to achieve a relatively even distribution of packets sent by each bonded port. In an alternative embodiment bonded ports are assigned to packet source identifiers so as to achieve a relatively even distribution of source identifiers among the bonded ports. If bonded ports are assigned to particular source identifiers, then the traffic is preferably monitored and the assignments are periodically adjusted to achieve even distribution of packet flow on the bonded link. The bonded ports may have different bandwidths, in which case traffic is distributed on a proportionate basis.

9 Claims, 13 Drawing Sheets